



DECISION MAKING TREE



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DECISION



It is the process of choosing a course of action from among alternatives to achieve a desired goal.

Types of decision

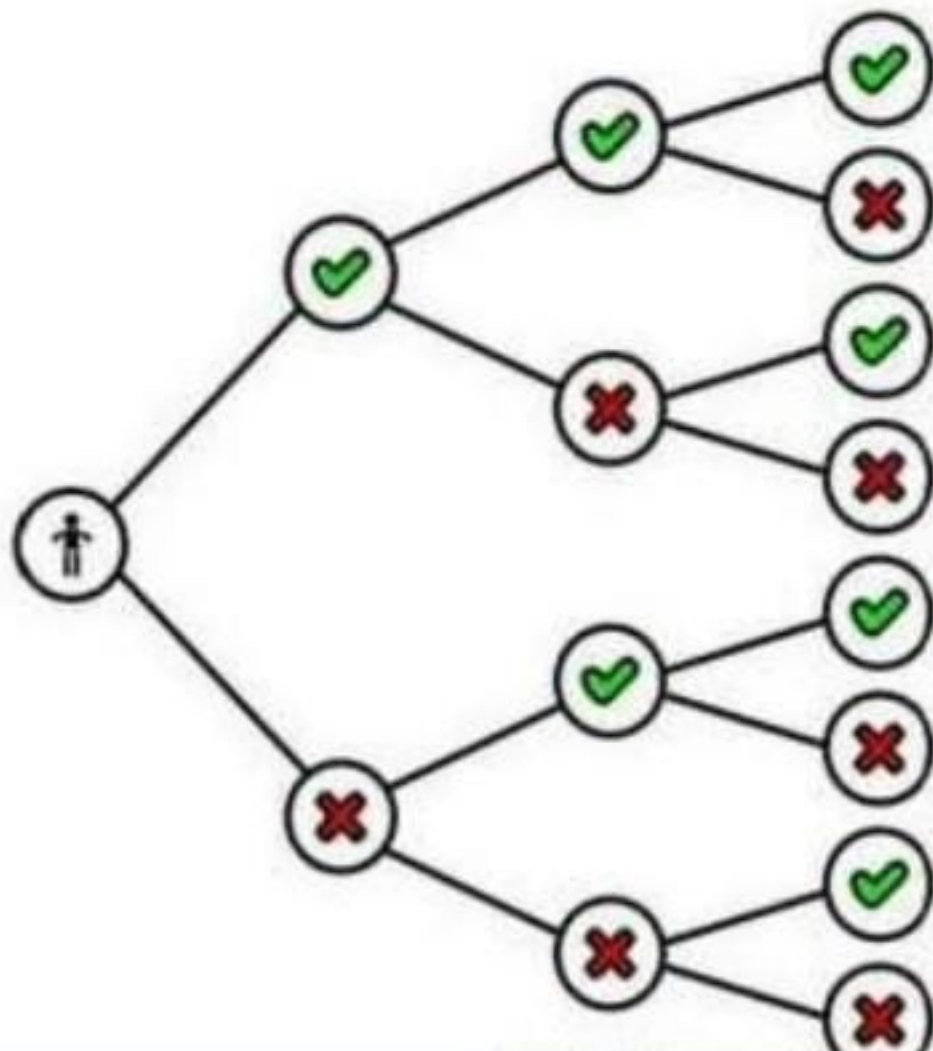
- Strategic Decision: Concerned with external environment of the organization.
- Administrative Decision: Concerned with structuring and acquisition of the organization's resources so as to optimize the performance of the organization.
- Operating Decision: Concerned with day to day operations of the organization such as pricing, production scheduling, inventory levels, etc.

Elements related to all decisions

- Goals to be achieved: Objectives which the decision maker wants to achieve by his actions
- The decision maker: Refers to an individual or an organization
- Courses of action: Also called “Action” or “Decision Alternatives”. They are under the control of decision maker
- States of nature: Exhaustive list of possible future events. Decision maker has no direct control over the occurrence of particular event.



DECISION TREE





A **decision tree** is a graphical representation of possible solutions to a decision based on certain conditions. It's called a decision tree because it starts with a single box (or root), which then branches off into a number of solutions, just like a tree.

ARE YOU
HAPPY?

YES

**CHANGE
SOMETHING.**

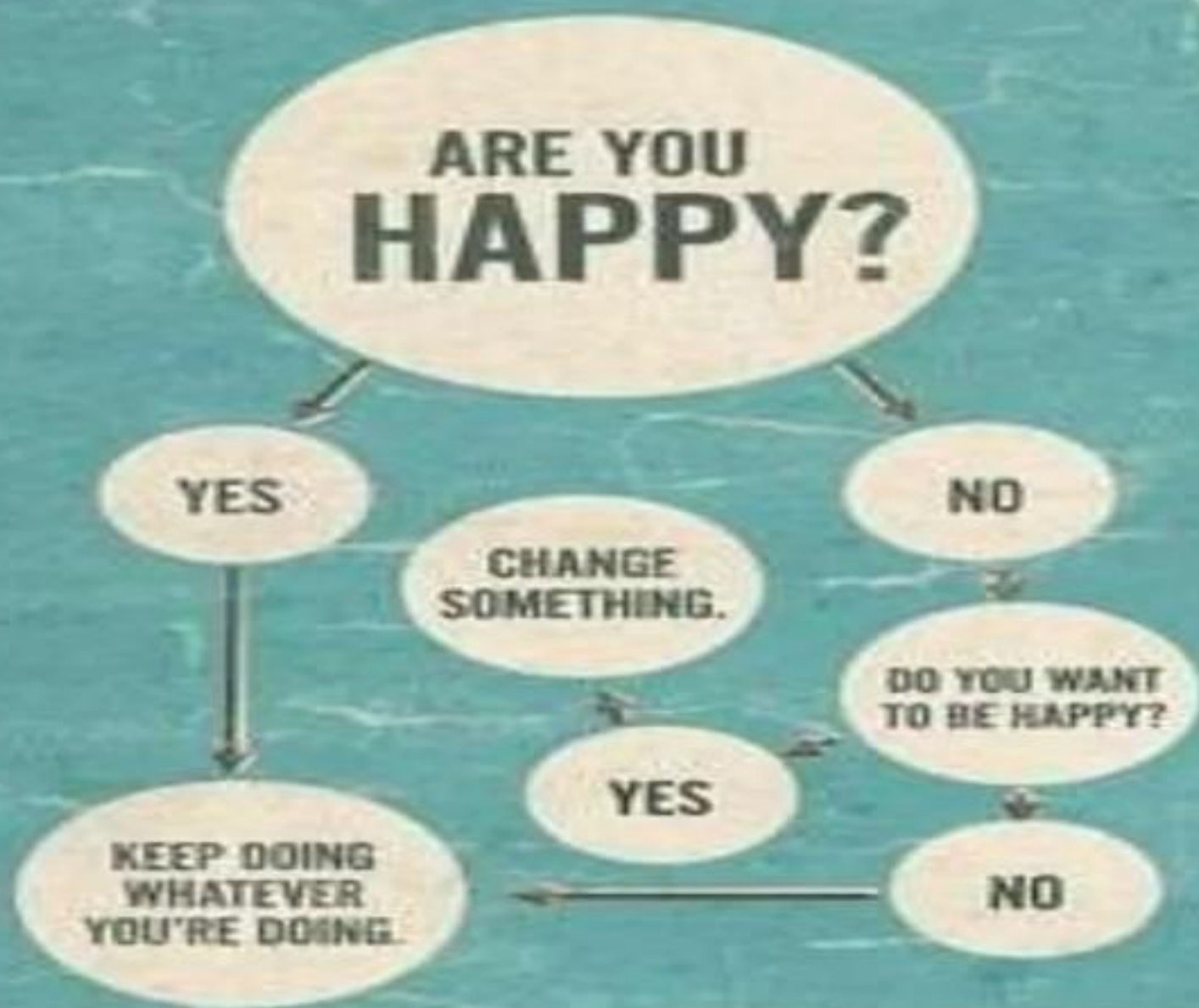
NO

**DO YOU WANT
TO BE HAPPY?**

YES

NO

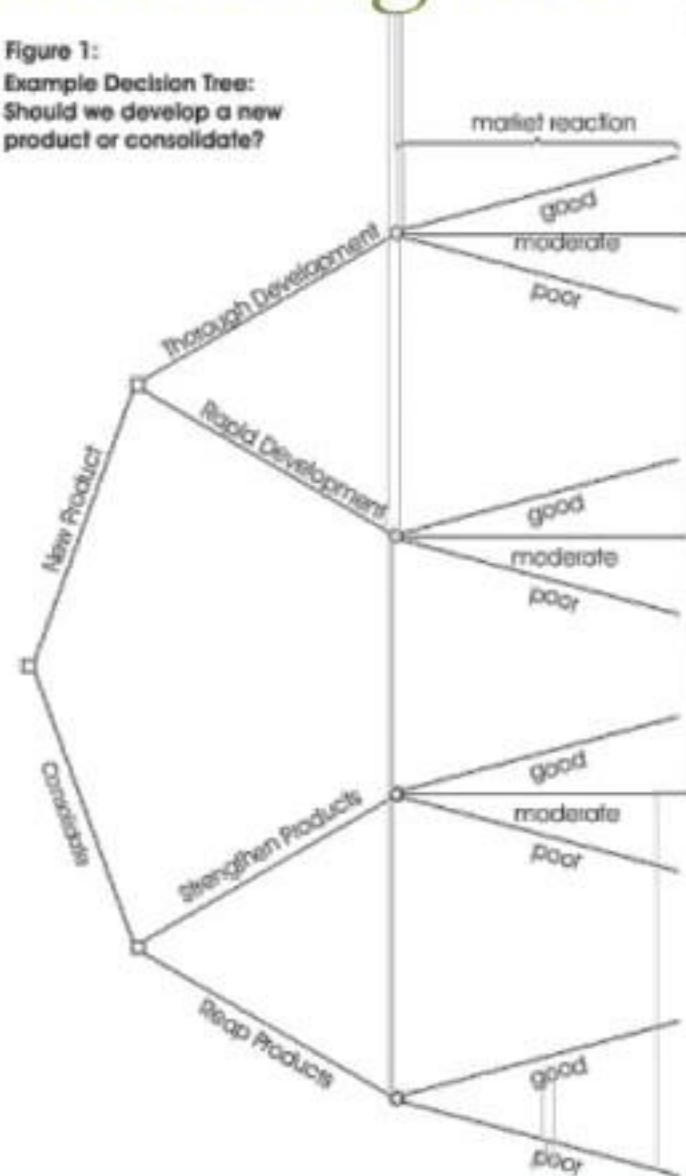
**KEEP DOING
WHATEVER
YOU'RE DOING.**



How to draw decision making tree

- You start a Decision Tree with a decision that you need to make.
- Draw a small square to represent this towards the left of a large piece of paper.
- From this box draw out lines towards the right for each possible solution, and write that solution along the line.
- At the end of each line, consider the results. If the result of taking that decision is uncertain, draw a small circle. If the result is another decision that you need to make, draw another square. Write the decision or factor above the square or circle. If you have completed the solution at the end of the line, just leave it blank.
- Keep on doing this until you have drawn out as many of the possible outcomes and decisions as you can see leading on from the original decisions.

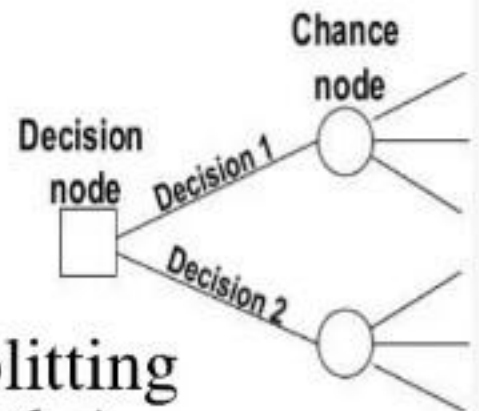
Figure 1:
Example Decision Tree:
Should we develop a new
product or consolidate?



- Decision trees can be drawn by hand or created with a graphics program or specialized software.
- Informally, decision trees are useful for focusing discussion when a group must make a decision.

A decision tree consists of 3 types of nodes -

1. **Decision nodes** - commonly represented by squares
2. **Chance nodes** - represented by circles
3. **End nodes** - represented by triangles



A decision tree has only burst nodes (splitting paths) but no sink nodes (converging paths).

A decision tree consists of 2 types of branches :-

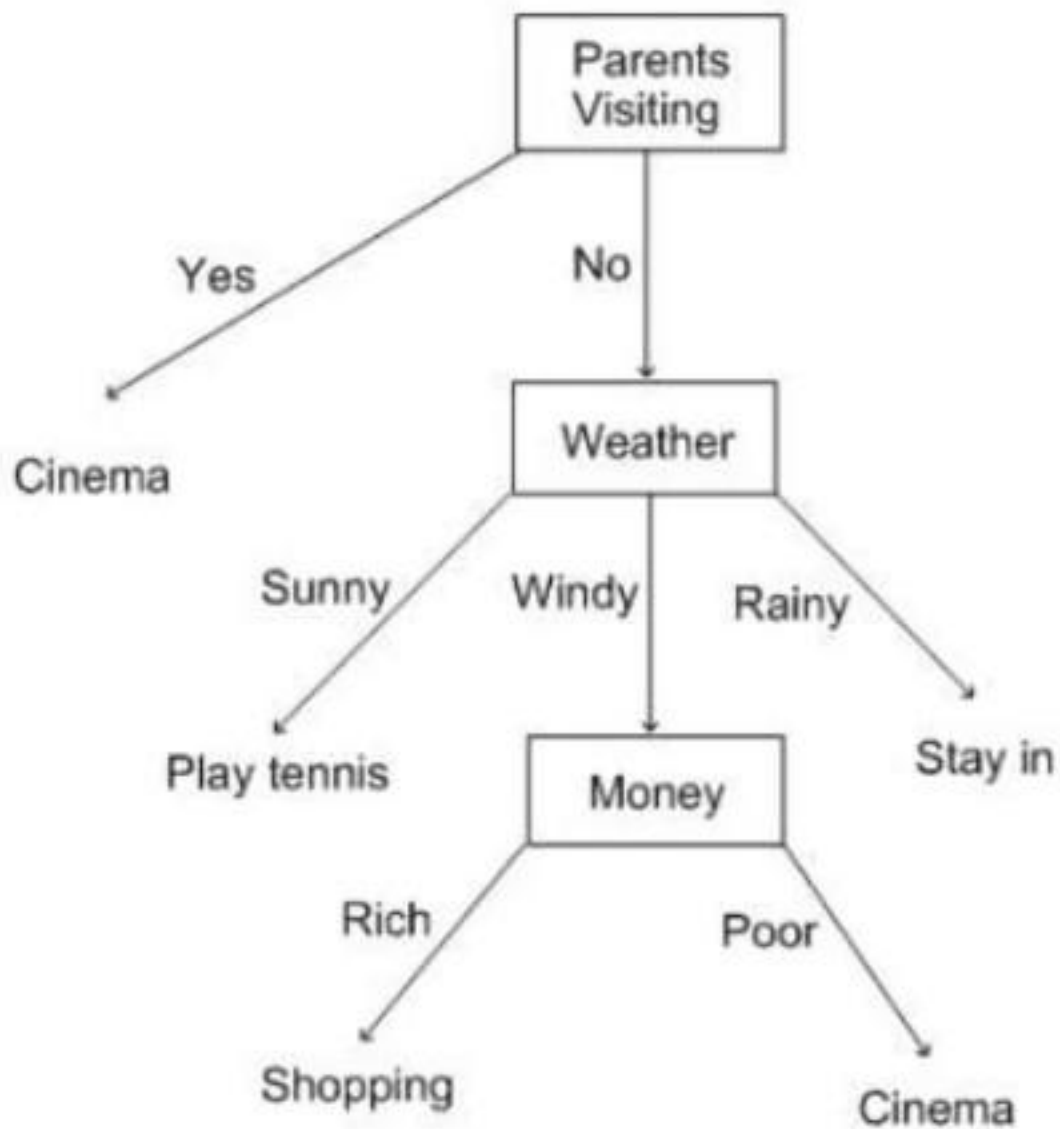
1. Decision branches
2. Event branches

The following table shows the three kinds of nodes and two kinds of branches used to represent a decision tree :-

<u>Type of Node</u>	<u>Written Symbol</u>	<u>Computer Symbol</u>	<u>Node Successor</u>
Decision	square	square	decision branches
Chance	circle	circle	event branches
End	endpoint	triangle	terminal value

D E C I S I O N T R E E

EXAMPLE



Explanation

You are making your weekend plans and find out that your parents might come to town. You'd like to have plans in place, but there are a few unknown factors that will determine what you can, and can't, do. Time for a decision tree.

First, you draw your decision box. This is the box that includes the event that starts your decision tree. In this case it is your parents coming to town. Out of that box, you have a branch for each possible outcome. In our example, it's easy: yes or no - either your parents come or they don't.

Your parents love the movies, so if they come to town, you'll go to the cinema. Since the goal of the decision tree is to decide your weekend plans, you have an answer.

But, what about if your parents don't come to town? We can go back up to the 'no branch' from the decision box and finish our decision tree.

If your parents don't come to town, you need to decide what you are going to do. As you think of options, you realize the weather is an important factor. So, Weather becomes your next box. Since its spring time, you know it will be rainy, sunny or windy. Those three possibilities become your branches.

If it's sunny or rainy, you know what you'll do-play tennis or stay in, respectively. But what if it's windy? If its windy, you want to get out of the house, but you probably won't able to play tennis. You could either go for movie or shopping. What will determine whether you go for shopping or movie. Money will determine so it will become your branch. If you have enough money or you are rich, go for shopping but if not, go for a movie.

We can see this by reading from the **decision node** to each end **node**:

If the parents are visiting, then go to the cinema

or

If the parents are not visiting *and* it is sunny, then play tennis

or

If the parents are not visiting *and* it is windy *and* you're rich, then go shopping

or

If the parents are not visiting *and* it is windy *and* you're poor, then go to cinema

or

If the parents are not visiting *and* it is rainy, then stay in.

ADVANTAGES



- *Are simple to understand and interpret*

People are able to understand decision tree models after a brief explanation.

- *Have value even with little hard data*

Important insights can be generated based on experts describing a situation (its alternatives, probabilities, and costs) and their preferences for outcomes.

- Use a white box model

If a given result is provided by a model, the explanation for the result is easily replicated by simple math.

- Can be combined with other decision techniques

It can be used with other techniques such as brainstorming.



To make a decision, all
you need is authority.

To make a good
decision, you also need
knowledge, experience,
and insight.

Thank you!

